Summary of LHCb Technical Board

21-23/02/2000

Agenda

1. SCADA Agreement
2. Computing support for test beams
3. T11-M1-SPD / Additional 12 cm for RICH 2
4. Technology Choice for Muon Chambers
5. Milestones
6. AOB

   Background calculations
   Vertex Tank (report from LEMIC)
   Belt for the ECAL

Participants: J. Christiansen, H. Dijkstra, W. Flegel (Monday), R. Forty, C.Gaspar (part-time on Monday for point 1), N. Harnew, H.J.
Hilke, B. Jost (part-time on Monday for point 2), B.Koene, D. Lacarrere, J. Lefrançois (Wednesday), R. Lindner, T. Nakada, T.Ruf, B.
Schmidt, A.Schopper, U. Straumann, O. Ullaland (as Referee for Muon technology choice), I. Videau, D. Websdale

Excused: W. Flegel (Wednesday), J. Harvey, J. Lefrançois (Monday)

1.SCADA

C. Gaspar presented a status report on the purchase of a SCADA system, proposed by JCOP, for the control supervision of the four LHC experiments. The market survey has been closed; 15 companies have answered. The tender procedure will start soon. The LHCb experiment will ask for 80 licenses in total, 60 run-time and 20 developer packages. The expected cost will be ~200 kCHF for LHCb, including maintenance for five years. The LCHb Computing Group has received no comments regarding the JCOP

proposal from the detector groups since last LHCb week. The TB recommended the JCOP proposal.

2.**Computing Support for test beams.**

B. Jost reported on the situation of the system management and DAQ support for the test beam activities. The LHCb Computing group will provide the system manager. J. Harvey has asked Orsay and Rutherford for assistance in the test beam DAQ. These institutes can not provide the requested support. The TB encouraged the group leaders to continue looking for support within their groups.

3.T11-M1-SPD / Additional 12 cm for RICH 2

H. J. Hilke summarized the conclusions from a meeting concerning space requirements in the area between RICH 2 and the Calorimeter system, held on January 14th, 2000:

- M1 can not be replaced by T11, because T11 does not provide fast pad information; nor by the SPD, because its pads are too big and it does not cover the innermost acceptance. The SPD can not be replaced by M1, because the distance to PS would be too big (parallax error), no sensible segmentation match has been found and because of serious connectivity problems; nor by T11, due to the absence of fast pad information.
- T11 is required because of its superior x-and y resolution of 200 μm demanded by RICH2. Without T11, the track angle resolution would deteriorate by a factor 2-3.5, leading to a serious loss in particle identification.
- Calorimetry does not require T11, the extrapolation from T10 being adequate because of the large calorimeter cell size.
- An increase of the RICH 2 thickness by 12 cm is important. Screening against the magnetic fringe field required a shift of the photodetectors, which demanded a rotation of the flat mirrors. Without an increase of the thickness, some 10% of the photoelectrons would be lost, on top of the loss of some 30% with respect to the TP, due to more realistic quantum efficiencies and mirror reflectivities. The additional 12 cm would gain back some 20% of the photoelectrons.
- B. Schmidt presented a study, performed by A. Wright, concerning the need of Tracker Station T11 for the Muon system. This analysis shows that the Muon system does not require T11 information over the outer acceptance region.

To allow time for reflection, the discussion was continued on Wednesday, when in agreement with the earlier conclusions, the TB reached consensus on the following recommendations:

- Both M1 and SPD should be kept.
- T11 should only cover the RICH 2 acceptance.
- Additional 12 cm in length should be given to RICH 2.

These 12 cm should be accomodated by reducing the M1 thickness by 3 cm, keeping the old boundaries for the Calorimeters, and reducing the thickness of T11, such that at most a 5 cm extension of RICH2 in the upstream direction is required.

4.Technology choice for the Muon Chambers.

A detailed presentation about the results from the technologies studied (TGC, RPC, WPC/CPC) was given by B. Schmidt, as well as a comparison on the basis of technical and financial criteria. Burkhard finally presented the conclusions and recommendations of the Muon Group Panel:

- The WPC/CPC technology is well adapted to the entire muon system, except for regions 1 and 2 of M1.
- The RPC could be used in some outer regions.
- The TGC could also be used in some outer regions but the time required to adapt it to higher rates is unclear; work on this technology should, therefore, be discontinued.
- The Panel recommended to answer a list of questions for the WPC/CPC and the RPC options (including manpower aspects for construction, testing and maintenance) within a few months and only then take the decision.

O. Ullaland presented the report from the referees (B. Koene, G Mitselmaker, O.Ullaland).

After an extensive discussion, the TB concluded: while the TB stresses the advantages of concentrating on a single technology, it endorses the panel recommendation but urges that the decision be taken by the next LHCb week.

5.Major Milestones

- Magnet: The TDR has been released on time (December 1999).
- Vertex Detector: No change.
- Inner Tracker: No change.

- Outer Tracker: The date of freezing the detector design is shifted by 6 months to 12/00 and the TDR to 3/01. This still allows sufficient time for construction and commissioning but allows more prototyping, required by the move from honeycomb to straw design.

- RICH: The TDR will be submitted to the LHCC this September, for presentation in October.
- Muon System: The Muon Group has made its first step towards the technology choice. The final decision is planned for May 2000. This will delay the milestone for the final technology choice by four months.
- Calorimeter: The TDR will be submitted to the LHCC this September, for presentation in October.

- Trigger: The intermediate milestone for the Pile-up veto (03/2000) will be delayed by 6 months. All other intermediate milestones set for March 2000 will be achieved.

6.AOB

- Support for background calculations has still to be found. It is urgent!
- HJH reported about the presentation of the VERTEX tank given to LEMIC February15th and about subsequent discussions. Many questions were raised, but it is hoped that the VELO group can dissipate most of the worries within a few months. The issue of possible beam instability requires tight collaboration with the accelerator experts.
- The Calorimeter Group proposed an additional intermediate belt with 6x6cm blocks for the ECAL This belt improves the B reconstruction efficiency for B to rho pi and B to D K* by 5-7% and improves the uniformity of pi0 acceptance as function of theta. The TB supports the addition of the belt.

Several TB members argued in favour of an increase of the number of Technical Boards per year, to give more time for detailed technical discussions. The TB accepted additional TB meetings.

R. Lindner, 25.5.2000